



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/727,926 | 11/30/2000 | Deepak V. Ayyagari | 00-8006 | 6354 |
| 32127 | 7590 | 06/09/2004 | EXAMINER | |
| VERIZON CORPORATE SERVICES GROUP INC. C/O CHRISTIAN R. ANDERSEN 600 HIDDEN RIDGE DRIVE MAILCODE HQEO3H14 IRVING, TX 75038 | | | PHAN, MAN U | |
| ART UNIT | | PAPER NUMBER | | |
| 2665 | | 7 | | |
| DATE MAILED: 06/09/2004 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-----------------------------|-------------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/727,926 | AYYAGARI ET AL. | |
| | Examiner Man Phan | Art Unit 2665 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 30 November 2000.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-32 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-5, 10-27 and 29-31 is/are rejected.

7) Claim(s) 6-9, 28 and 32 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4.

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
5) Notice of Informal Patent Application (PTO-152)
6) Other: ____.

DETAILED ACTION

1. The application of Ayyagari et al. for an "Integrated method for performing scheduling, routing and access control in a computer network" filed 11/30/2000 has been examined. Claims 1-32 are pending in the present application.

Claim Objections

2. Claim 23 is objected to because of the following informalities:

The claim contains the phrase "capable of". It has been held that the recitation that an element is "capable of" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Appropriate correction is required.

Claim Rejections - 35 USC '112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 recites the limitation "the beginning of a time frame" in line 12.

Claim 23 recites the limitation "the capacity" in line 6. There is insufficient antecedent basis for these limitations in the claims.

Claim Rejections - 35 USC ' 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 1038 and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-5, 20-22 and 23-27, 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toh (US#5,987,011) in view of Haas (US#6,304,556).

With respect to claims 23-27 & 29-31, both Toh (US#5,987,011) and Haartsen (US#5,491,837) disclose a novel system for sending data in a mobile ad-hoc wireless networks,

according to the essential features of the claims. Toh (US#5,987,011) discloses a routing method for supporting ad-hoc mobile communications within a radio communications network. The network comprises a plurality of mobile hosts including a source mobile host and a destination mobile host, and a plurality of radio communications links connecting together with mobile hosts. The method comprises measuring the stability of the communications links between neighbouring mobile hosts using an associativity based characteristic and selecting a communications route through the network from the source mobile host to the destination mobile host based on the stability of the communications links. The associativity characteristic is measured by each mobile host periodically transmitting and receiving identifier beacons (ticks) and updating the status of its corresponding links. The greater the number of ticks associated with a given link, the greater its stability. Use of the associativity characteristic enables the routing method to deal efficiently with mobile host migrations throughout the network (Col. 3, lines 25 plus and Col. 21, lines 18 plus). Furthermore, the method of Toh's present invention is hereinafter referred to as Associativity-Based Routing (ABR). ABR is a compromise between broadcast and point-to-point routing and uses the previously mentioned connection-oriented packet forwarding approach (*scheduling, routing and access control decision made in a previous time frame of the network*). ABR only maintains routes for source mobile hosts that actually desire routes. However, ABR does not employ route reconstruction based on alternative route information stored in intermediate nodes, which advantageously avoids stale routes. In addition, routing decisions are performed at the destination mobile host and only the best route will be selected and used while all other possible routes remain passive, thereby avoiding packet

duplicates. Furthermore, the selected route tends to be more long-lived due to the property of associativity (Col. 7, lines 52 plus).

However, Toh does not disclose expressly wherein the nodes are organized into at least one of a cluster and a clique. In the same field of endeavor, Haas (US#6,304,556) discloses in Fig. 3 a schematic diagram of the ad-hoc network, including a plurality of nodes 22s grouped into clusters 24, 26, 28, 30 of nodes, and a plurality of wireless links connecting the plurality of nodes 22s. In each cluster, one node labeled CH1, CH2, CH3 and CH4, respectively, is chosen to be a cluster head. The cluster heads thus form a tier-2 network 32. Note that the tier-1 and the tier-2 networks are separate. Routing between nodes that belong to the same tier-1 network is either peer-to-peer or through the cluster head. Each cluster head "knows" the identities of all the nodes in its cluster and the routes between the cluster head and the cluster node. A route between two nodes that belong to two different tier-1 networks is determined by the cluster head of the source node through querying the other cluster heads about the location of the destination. This querying is performed within the tier-2 network. The routing is then as follows: source node to its cluster head, source cluster head to destination cluster head, destination cluster head to the destination node. The first and the third segments are within tier-1 networks. The second segment is within the tier-2 network. The advantage of a multi-tier ad-hoc network is in the relatively efficient way that the routes are determined by the cluster heads. The disadvantage of the multi-tier approach is in increased congestion at the cluster head nodes, reduced system reliability due to a single point of failure, and in sub-optimality of routing paths (Col. 8, lines 37 plus and Col. 19, lines 28 plus).

Regarding claims 1-5 & 20-22, they are method claims corresponding to the apparatus claims 23-27 & 29-31 above. Therefore, claims 1-5, 20-22 are analyzed and rejected as previously discussed with respect to claims 23-27, 29-31.

One skilled in the art would have recognized the need for effectively and efficiently routing data in a mobile ad-hoc wireless networks, and would have applied Haas' network communication protocols for routing and mobility management into Toh's novel routing method for supporting ad-hoc mobile communications within a radio communication network. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Haas' routing and mobility management protocols for ad-hoc networks into Toh's routing method for ad-hoc mobile networks with the motivation being to provide a method and system for performing scheduling, routing and access control in an ad-hoc wireless network

6. Claims 10-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toh (US#5,987,011) in view of Haas (US#6,304,556) as applied to claims above, and further in view of Walrand et al. (US#6,647,413).

With respect to claims 10-19, Toh and Haas disclose the claimed limitations discussed in paragraph 5 above. In the same field of endeavor, Walrand et al. (US#6,647,413) provides a method and apparatus for measuring performance in packet switched networks. In each node, a node monitor maintains information for each virtual channel passing through the node, including a list of the arrival times of the packets queued for the virtual channel. In addition, each node determines node performance characteristics, which may include throughput, effective rate,

delay, loss rate, and occupancy. The network further includes a network monitor, which periodically collects the node performance characteristics from each node and determines performance characteristics for each virtual channel in the network, end-to-end. The network performance characteristics may include throughput, effective rate, delay, loss rate, and occupancy. The results are useful for network operators and users to optimize the network and/or their use of the network. Periodically, the network monitor receives the node performance characteristics from each node and then determines overall performance characteristics for the virtual channels in the network from end to end (from the virtual channel source to its destination). This information may then be provided in a report to a network operator or one or more users, who can then use the information to optimize the network and/or their use of the network (Figs. 1, 2; Col. 2, lines 25 plus).

One skilled in the art would have recognized the need for effectively and efficiently routing data in a mobile ad-hoc wireless networks, and would have applied Walrand's node level performance in a distributed performance measurement system, and Haas' network communication protocols for routing and mobility management into Toh's novel routing method for supporting ad-hoc mobile communications within a radio communication network. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Walrand's method and apparatus for measuring performance in packet switched networks, and Haas' routing and mobility management protocols for ad-hoc networks into Toh's routing method for ad-hoc mobile networks with the motivation being to provide a method and system for performing scheduling, routing and access control in an ad-hoc wireless network.

Allowable Subject Matter

7. Claims 6-9 and 28, 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is an examiner's statement of reasons for the indication of allowable subject matter: The closest prior art of record fails to disclose or suggest wherein the network layer incorporates a routing routine for determining a destination for the at least one flow of the plurality of nodes of the network based upon a characteristics of at least one of the physical and link layers, as expressly recited in the claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Elliott (US#6,456,599) is cited to show the distributing of potential neighbor information through an ad hoc network.

The Passman et al. (US#6,493,759) is cited to show the cluster head resignation to improve routing in mobile communication systems.

The Li (US#6,385,174) is cited to show the method and apparatus for transmission of node link status messages throughout a network with reduced communication protocol overhead traffic.

The Perkins (US#5,412,654)) is cited to show the highly dynamic destination sequenced destination vector routing for mobile computers.

The Okanoue (US#6,307,843) is cited to show ad hoc network of mobile hosts using link table for identifying wireless links and destination addresses.

The Krishnamurthy et al. (US#6,735,448) is cited to show the power management for throughput enhancement in wireless ad hoc networks.

The Redi (US#6,512,935) is cited to show the energy conserving network protocol.

The Cansever (US#6,678,252) is cited to show the method and apparatus for dynamic source routing in ad hoc wireless networks.

The Love et al. (US#6,058,107) is cited to show the method for updating forward power control in a communication system.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (703)305-1029. The examiner can normally be reached on Mon - Fri from 6:30 to 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (703) 308-6602. The fax phone number for the organization where this application or proceeding is assigned is (703)305-3988.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

11. *Any response to this action should be mailed to:*

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 305-9051, (for formal communications intended for entry)

Or: (703) 305-3988 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Mphan

06/01/2004.

Manu. Phan
MAN PHAN
PATENT EXAMINER